IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)
e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 5 Ver. I (Sep - Oct. 2015), PP 20-24
www.iosrjournals.org

Evaluation of Anti-inflammatory and Analgesic activity of Abrus precatorious leaves on Albino rats

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Abstract: *The Plant Abrus precatorious Linn. (family-Fabaceae) is known to have wide-ranging medicinal properties. Ethanolic extract of Abrus precatorious leaves were administered to investigational rats. To study the analgesic as well as anti-inflammatory effects of Ethanolic extract of Abrus precatorious leaves in suitable monster models, the foliage of Abrus precatorious were extracted with ethanol using Soxhlet apparatus. The extract hence obtained was screened meant for analgesic and anti-inflammatory activity using Eddy's hot plate method and carrageenan induced paw edema method in albino rats correspondingly. Tramadol as well as Diclofenac sodium were used as standard drugs for Analgesic and Anti-inflammatory activity correspondingly. The analgesic effect was evaluated in albino rat by Eddy's hot plate method and compared with the standard, Tramadol (5 mg/kg body weight). The results showed that Abrus precatorious has significant lessening ($p \leq 0.01$) in swelling i.e. 27.51% (200 mg/kg body weight) in addition to 36.68% (400 mg/kg body weight) as compared to the standard drug Diclofenac sodium which was 37.41%. In assessing analgesic property, there is a considerable ($p < 0.01$) reduction in the paw jumping response for Abrus precatorious (400 mg/kg) and Tramadol (5mg/kg) when compared to control group. These outcomes delegate that the extracts could possess analgesic and anti-inflammatory properties. Everyone these effects and the changes in the behavioural activities could be suggested as contributory effects to the use of Abrus precatorious leaf in the management of inflammation and painful conditions.*

Key word: *Abrus precatorious, Analgesic, Anti-inflammatory, Eddy's hot plate, Carrageenan-induced paw edema.*

I. Introduction

Inflammation is the response to injury of cells and body tissues through different factors such resembling that contamination, chemicals, insensible and thermal injuries.[1] Most of the anti-inflammatory drugs now available are potential inhibitors of cyclooxygenase (COX) pathway of arachidonic acid metabolism which produce prostaglandins (PG). Prostaglandins (PG) are convincing vasodilators, hyperalgesic and in addition throw passionate to pain, erythema and edema. Hence treating inflammatory diseases, pain reliever along with anti-inflammatory agents are mandatory.[2] Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most clinically important medicine used for the treatment of inflammation-related diseases like arthritis, asthma, and cardiovascular (CVS) disease.[3] NSAIDs (Non narcotic anti-inflammatory drugs) are among the most widely used medications due to their efficacy for a wide range of pain and inflammatory situation.[4] On the other hand, the long-term administration of NSAID may induce renal disorders, bleeding along with gastro-intestinal (GIT) ulcers owed to their nonselective inhibition of both constitutive (COX-1) and inducible (COX-2) isoforms of the cyclooxygenases enzymes.[5-7] Accordingly, novel anti-inflammatory & pain reliever drugs lacking those effects are being searched all over the world as alternatives to opiates and NSAIDs.[8-9] Medicinal plants are believed to be an important source of new chemical substances with potential soothing effects. The investigation into plants with supposed folkloric apply as anti-inflammatory agents and pain killer, should for that reason be viewed as a fruitful and logical research strategy in the search for new analgesic and anti-inflammatory drugs.[10] Medicinal plants can be important sources of unknown chemical substances with potential therapeutic effects. The Abrus precatorious Linn. (Family: fabaceae) is identified to embrace different restorative properties. Abrus precatorious Linn. Is rock climbing greenery its leaves and seeds are widely used in the Ayurveda to cure a lot of diseases. The leaves as well as roots are fairly sweet. Abrus precatorious is a willowy perpetual climber that twines around trees, shrubs and hedges. It has no special organ of accomplice. The leaves are glabrous during wide internodes. It has willowy brushwood along with cylindrical wrinkled stem with a smooth textured tanned shout. Roots are intensely and obstinately difficult to survive eradicated. It is a native plant that grows most excellent in quite dry regions at squat elevations.[11]

II. Materials And Methods:

Plant Collection & substantiation of plant material:

Leaves of plant (Abrus precatorious) were collected in University of Rajasthan Jaipur (Rajasthan) in the month of 2/02/2015. The Plant was identified and authenticated by taxonomist Mr.Vinod Sharma and provides Regis. No.: **RUBL211487**

Preparation of leaves Abrus precatorious Extract:

Fresh leaves of Abrus precatorious were washed first in sterilized distillated water, followed via washing in mercuric chloride ($Hgcl_2$) solution (0.1 %) and just the once more washed in fresh distilled hose. Leaf matter was weigh up & transferred on to a spotlessly clean mortar and pestle to make a crude crushing of the substance, consequent which it was transferred on to a sanitary homogenizer and precisely crushed. In relation to 100 grams of clumsily powdered plant material was comprehensively extracted for 2 h with 200 ml of dissimilar solvents separately at their boiling point temperature in soxhlet equipment. The solvents used projected for pulling out of plant leaves are petroleum ether as well as ethanol. The extract obtained was potable and evaporated under condensed pressure via Rota-vapors. The extracts are dissolved in the dimethyl-sulphoxide to build the final concentrations which were reserved in refrigerator till used.

Experimental Animals:

Albino rats (Wistar strain) of either sex weighing between 150-200 gm will be used in the learning. Animals which are used in laboratory housed under normal laboratory conditions in (standard polypropylene cages) relative moisture (60 ± 5%), restricted temperature (25 ± 2ºC) as well as light. Each animal will be use only once in the experimentation. Food was introvert 12 hrs facing and during the experimental hours. The investigational protocol was acceptable by Institutional Animal Ethics Committee (IAEC) with Reign. No.931/PO/ac/06/CPCSEA.

Acute toxicity study:

LD50 (lethal dose) of Abrus precatorious linn was 2000 mg/kg. Hence 1/10th of LD50 dose is 400 mg/kg of Abrus precatorious linn was selected as a maximum therapeutic dose and 200mg/kg was selected as lower dose for the ethanolic extract of leaf extract of Abrus precatorious linn for performing the pharmacological action. Later than supervision through diverse doses of the test extract the animals were observed for 72 hrs (acute study) for gross behavioral changes.

III. Evaluation Of Anti-Inflammatory Action Of Abrus Precatorious

Carrageenan induced rat paw oedema

In this experiment, carrageenan-induced rat hind paw edemas was used as the animal model of acute inflammation12 according to Winter et al., 1962 and describe previously (Saha et al. 2007). Briefly, acute inflammation was produced by sub plantar injection of 0.1 ml of 1% suspension of carrageenan with 2% gum acacia in characteristic saline, in the right posterior paw of the rats one hour subsequent to the oral administration of test materials. The paw volume was calculated by plethysmometer at 1, 2, 3, as well as 4 h consequent to the carrageenan enhancement. The extract was administered at 200 as well as 400 mg/kg on the basis of body weight. Diclofenac sodium 10 mg/kg body weight was used as standard anti-inflammatory mediator.

% of Inhibition= Mean paw inflammation of control group - Mean paw inflammation of test group / Mean paw inflammation of control group × 100

Evaluation Of Analgesic Activity Of Abrus Precatorious

The ethanolic extract of plant leaves of Abrus precatorious linn was evaluated for its analgesic activity by Eddy's hot plate method.

Eddy's hot plate method

In this method Adult Albino rats of either sex were selected. The Eddy's hot plate was maintained stuck between 55±10c. The animals were placed on the hot plate and the time taken for paw licking or jumping was recorded with stop watch. The reaction time was observed on 0, 15, 60, 120 minute. The anti-nociceptive outcome of ethanolic extract was assessed using this method.[13]

Table 1:- Anti-inflammatory activity of leaves extract of Abrus precatorious Linn by carrageenan induced rat paw edema. % Increase in Paw Volumes (ml × 1000) ± SEM (Percent inhibition)

Group	1 hour	2 hour	3 hour	4 hour
Control	70.7 ± 2.06	92.8 ± 1.19	107.2 ± 2.27	114.5 ± 3.47
A.P. extract 200mg/kg	58.2 ± 1.14** (17.69)	70.3 ± 1.91** (24.24)	71.2 ± 3.44** (28.77)	83.0 ± 2.50** (27.51)
A.P. extract 400mg/kg	50.3 ± 2.68** (28.77)	63.2 ± 1.74** (31.96)	69.2 ± 2.98** (35.46)	72.5 ±2.92** (36.68)
Diclofenac sodium (10 mg/kg)	47.3 ± 1.48** (33.02)	57.7 ± 2.64** (37.88)	61.3 ± 1.58** (38.72)	71.7 ± 3.04** (37.41)

*Probability values (calculated as compared to control using one way-ANOVA method **P<0.001 All values are means of entity data obtained from six rats (n = 6)

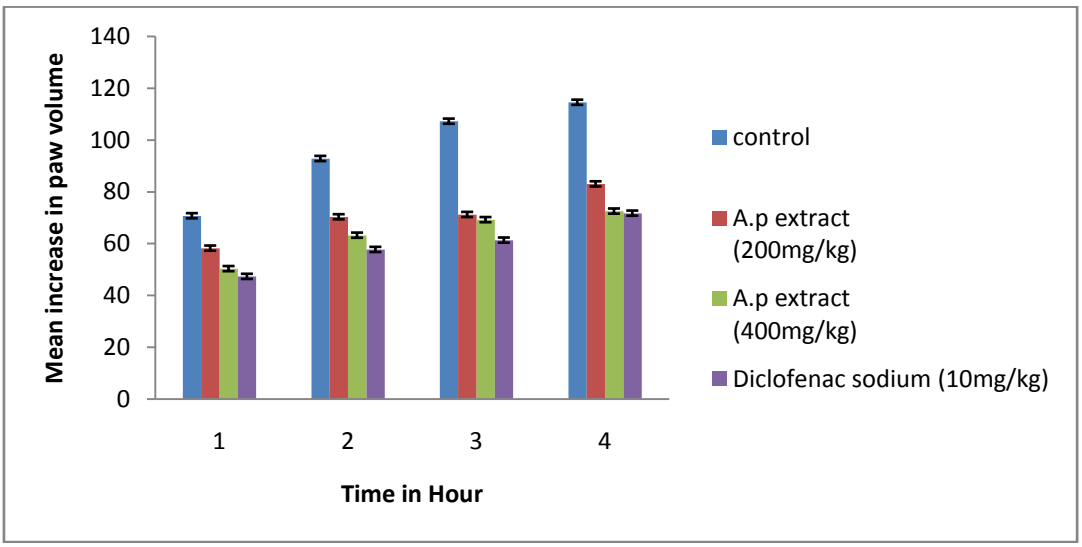

Fig: 1- Anti-inflammatory activity of leaves extract of Abrus precatorious Linn by carrageenan induced rat paw edema.

Table 2:- Analgesic effect of ethanolic extract of Abrus precatorious Linn. By Eddy's hot plate method

Groups treated	Dose	Basal reaction time			
		0min.	30min.	60min.	120min.
Control	-	2.0±0.1	2.2±0.2	2.33±0.21	2.28±0.1
Tramadol	5 mg/kg	3.1±0.2	7.5±0.3	10.1±0.3**	12.8±0.80**
A.P. extract	200 mg/kg	2.5±0.3	2.8±0.1	4.33±0.3333	4.8±0.7*
A.P. extract	400 mg/kg	2.2±0.5	4.7±0.2*	7.33±0.3333**	8.8±0.5**

All values are given in mean±SD, (n=6) ANOVA *p<0.05, **p< 0.01, ***p<0.001, when compare to control group

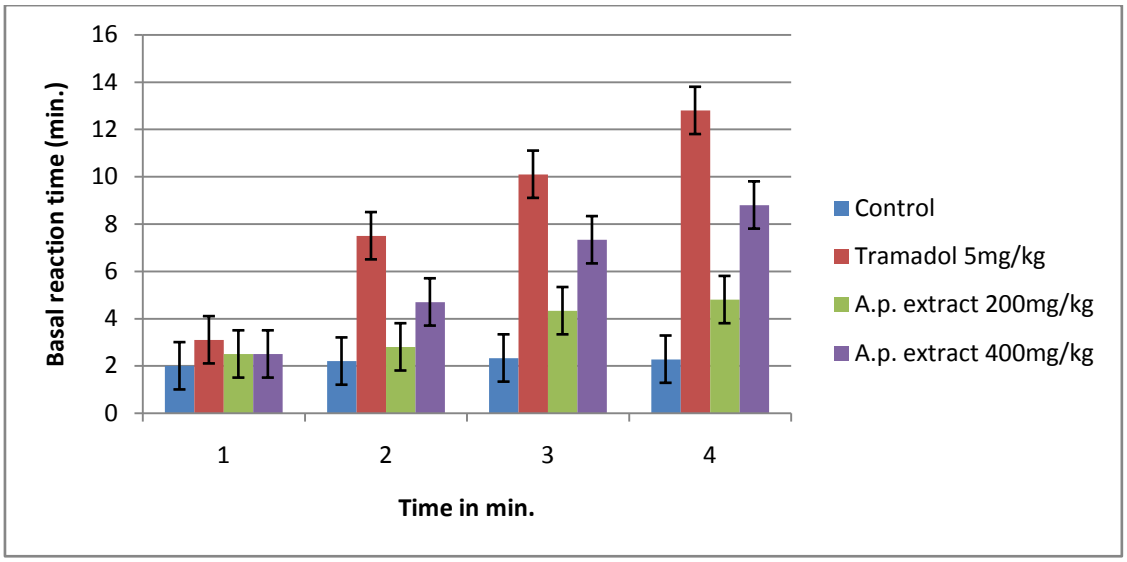

Fig: 2- Analgesic effect of ethanolic extract of Abrus precatorious Linn. By Eddy's hot plate method

IV. Statistical Analysis

Statistical analysis was performed using Microsoft Excel and Sigma Graph pad prism version-4 USA. Data was described as Mean ± SD and Percentage (%). Negative sign (-) show decrease and positive (+) sign indicates increase correspondingly. One way ANOVA multiple comparison tests were used for analysis multiple group comparisons. For all inferential statistical tests a two tailed P rate of $p \leq 0.01$was calculated considerable.[14]

V. Results And Discussion

Oral administration of Abrus precatorious significantly repressed ($p \leq 0.01$) the carrageenan induced paw edema within rat at both doses (200 and 400 mg/kg) calculated. On 200 mg/kg dose, 27.51 % embarrassment and at 400 mg/kg dose, 36.68 % embarrassment was pragmatic. The group treated by Diclofenac sodium (10 mg/kg) showed maximum inhibition of edema, which was 37.41 % as shown in Table 1. Inflammation is a complex process and a variety of mediators e.g. leukotrienes, prostaglandins and kinins, platelet activating feature, etc. have been reported to be implicated in the development if inflammatory diseases. Carrageenan assay is well studied for comparative bioassay of anti-inflammatory agents, because the virtual potency estimates obtained from most drugs tend to reflect clinical practice.[4] The time route of edema enlargement on carrageenan induced paw edema model in rats is generally represented by a curve.[8] The first phase occurs within an hour of injection and also owing to the serotonin constituent.[8] Prostaglandins play a main role in the improvement of the second phase of reaction which is measured around 3 h times.[9] The presence of prostaglandin in the inflammatory exudates form the injected foot has been well demonstrated previously by other workers.[10] The carragenan induced paw oedema model in rats is known to be sensitive to cyclooxygenase inhibitors and has been used to evaluate the effect of non-steroidal anti-inflammatory agents which primarily inhibit cyclooxygenase involved in prostaglandin production.[11] Based on this hearsay, it is inferred that the inhibitory effect of Abrus precatorious on carrageenan induced inflammation in rats in the present study may be due to inhibition of the enzyme cyclooxygenase, most important to embarrassment of prostaglandin synthesis.Based on these reports to inhibition of the enzyme cyclooxygenase leading to inhibition of prostaglandin (PG) production. Basal reaction time is recorded as mentioned in the method using analgesiometer. Here the reaction may be hind paw licking or jump response. Hind paw licking appears within 4-6 sec and after 2-3 sec jumping may start. One has to observe both these response before and after administration of drug like Tramadol (5mg/kg). It has been reported that the leaves of Abrus precatorious contains Glycosides. A lot of Tri terpenoids glycosides are used in anti-inflammatory and analgesic agents in recent medicine. Preliminary phytochemical studies indicated the presence of Volatile oils, resins, flavonoids and terpenoids isolated form plant extracts are known to produce anti-inflammatory and analgesic effects.

VI. Conclusions

The findings of the present study have demonstrated that Abrus precatorious has potent anti-inflammatory and analgesic activity and justify its use in traditional medicine to treat inflammatory and hurting situation. The results also furnish evidence that the beneficial effects of this plant may be due to its free radical scavenging activity.

Acknowledgements

The authors would like to thanks Dr. Rajesh Asija (Principal, professor) & Dr. Radhey shyam Kumawat (H.O.D.) Maharishi Arvind Institute of Pharmacy, Jaipur (Rajasthan) for providing necessary facility for the successful completion of the research job. Auxiliary, the authors wish to make longer their gratitude to the anonymous reviewers for their valuable Comments in improvising the research article.

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